

**WHAT IS CLAIMED IS:**

1           1.       A method of establishing bi-directional connectivity of a network  
2 element in a network, the method comprising:  
3           receiving a first unreliable packet from said network element;  
4           storing an address of said network element in a neighbor pending list;  
5           sending a reliable packet to said network element; and  
6           if an acknowledgement to said reliable packet is received from said network  
7           element,  
8           accepting said network element as a neighbor.

1           2.       The method of claim 1, wherein said unreliable packet does not require  
2 a response.

1           3.       The method of claim 1, wherein said reliable packet requires a  
2 response.

1           4.       The method of claim 1, wherein said accepting said network element  
2 as neighbor is done by moving said address of said network element from said  
3 neighbor pending list to a neighbor list.

1           5.       The method of claim 4, further comprising:  
2 if said address of said network element is in said neighbor list,  
3           updating a neighbor hold count for said network element.

1           6.       The method of claim 1, further comprising:  
2 determining if said address of said network element is in a dampening list.

1           7.       The method of claim 6, further comprising:  
2 if said address of said network element is in said dampening list,  
3           updating a value of a reliability count of said network element to  
4           reflect higher reliability of said network element.

8. The method of claim 7, further comprising:  
if said value of said reliability count is a maximum value,  
moving said address of said network element from said dampening list  
to said neighbor pending list.

9. The method of claim 8, wherein said maximum value is predetermined.

10. The method of claim 8, wherein said maximum value is dynamically  
adjusted according to a traffic condition in said network.

11. The method of claim 6, further comprising:  
if said network element is not in said dampening list,  
adding said address of said network element to said dampening list,  
and  
setting said value of said reliability count of said network element to  
said maximum value.

12. The method of claim 11, further comprising:  
setting said neighbor hold count for said network element; and  
sending a second unreliable packet to said network element.

13. The method of claim 1, further comprising:  
initiating a neighbor pending timer.

14. The method of claim 12, further comprising:  
if said acknowledgement to said reliable packet is not received before said  
neighbor pending timer expires,  
removing said address of said network element from said neighbor  
pending list, and  
updating said value of said reliability count to reflect lower reliability  
of said network element.

1        15.    The method of claim 12, further comprising:  
 2        if said acknowledgement to said reliable packet is received before said  
 3                neighbor pending timer expires,  
 4                moving said address of said network element from said neighbor  
 5                pending list to said neighbor list, and  
 6                removing said address of said network element from said dampening  
 7                list.

1        16.    A system for establishing bi-directional connectivity with a network  
 2        element in a network comprising:  
 3                a central processing module; and  
 4                a neighbor pending list coupled to said central processing module, wherein  
 5                said central processing module is configured to store an address of said  
 6                network element in said neighbor pending list while said network  
 7                element is in a process of establishing said bi-directional connectivity  
 8                with said system.

1        17.    The system of claim 16, further comprising:  
 2        an input-output module coupled to said central processing module, wherein  
 3                said input-output module is configured to provide input-output  
 4                interface to said central processing module; and  
 5        a counter module coupled to said central processing module, wherein said  
 6                counter module is configured to provide at least one of timing and  
 7                counting functionality to said central processing module.

1 18. The system of claim 16, further comprising:  
 2 a neighbor list coupled to said central processing module, wherein said  
 3 neighbor list is configured to store said address of said network  
 4 element after said bi-directional connectivity is established with said  
 5 network element; and  
 6 a dampening list coupled to said central processing module, wherein said  
 7 dampening list is configured to store said address of said network  
 8 element when a value of a reliability count in said counter module is  
 9 lower than a maximum value.

1 19. The system of claim 18, wherein said maximum value is  
 2 predetermined.

1 20. The system of claim 18, wherein said maximum value is dynamically  
 2 adjusted according to a traffic condition in said network.  
 3

1 21. A network device comprising:  
 2 a processor; and  
 3 a network interface coupled to said processor, said processor is configured to  
 4 receive a first unreliable packet from said network element,  
 5 store an address of said network element in a neighbor pending list,  
 6 send a reliable packet to said network element, and  
 7 if an acknowledgement to said reliable packet is received from said  
 8 network element,  
 9 accept said network element as a neighbor.

1 22. The network device of claim 21, wherein said unreliable packet does  
 2 not require a response.

1 23. The network device of claim 21, wherein said reliable packet requires a  
 2 response.

1           24.    The network device of claim 21, wherein said accepting said network  
2 element as neighbor is done by moving said address of said network element from  
3 said neighbor pending list to a neighbor list.

1           25.    The network device of claim 24, wherein said processor is further  
2 configured to  
3           if said address of said network element is in said neighbor list,  
4           update a neighbor hold count for said network element.

1           26.    The network device of claim 21, wherein said processor is further  
2 configured to  
3           determine if said address of said network element is in a dampening list.

1           27.    The network device of claim 26, wherein said processor is further  
2 configured to  
3           if said address of said network element is in said dampening list,  
4           update a value of a reliability count of said network element to reflect  
5           higher reliability of said network element.

1           28.    The network device of claim 27, wherein said processor is further  
2 configured to  
3           if said value of said reliability count is a maximum value,  
4           move said address of said network element from said dampening list to  
5           said neighbor pending list.

1           29.    The network device of claim 28, wherein said maximum value is  
2 predetermined.

1           30.    The network device of claim 28, wherein said maximum value is  
2 dynamically adjusted according to a traffic condition in said network.

1           31.    The network device of claim 6, wherein said processor is further  
2 configured to  
3           if said network element is not in said dampening list,  
4                    add said address of said network element to said dampening list, and  
5                    set said value of said reliability count of said network element to said  
6                    maximum value.

1           32.    The network device of claim 31, wherein said processor is further  
2 configured to  
3           set said neighbor hold count for said network element; and  
4           send a second unreliable packet to said network element.

1           33.    The network device of claim 31, further comprising:  
2           initiate a neighbor pending timer.

1           34.    The network device of claim 32, wherein said processor is further  
2 configured to  
3           if said acknowledgement to said reliable packet is not received before said  
4                    neighbor pending timer expires,  
5                    remove said address of said network element from said neighbor  
6                    pending list, and  
7                    update said value of said reliability count to reflect lower reliability of  
8                    said network element.

1           35.    The network device of claim 32, further comprising:  
2           if said acknowledgement to said reliable packet is received before said  
3                    neighbor pending timer expires,  
4                    move said address of said network element from said neighbor pending  
5                    list to said neighbor list, and  
6                    remove said address of said network element from said dampening list.



1 43. The network device of claim 42, further comprising:  
2 means for moving said address of said network element from said dampening  
3 list to said neighbor pending list.

1 44. The network device of claim 43, wherein said maximum value is  
2 predetermined.

1 45. The network device of claim 43, wherein said maximum value is  
2 dynamically adjusted according to a traffic condition in said network.

1 46. The network device of claim 41, further comprising:  
2 means for adding said address of said network element to said dampening list  
3 if said network element is not in said dampening list, and  
4 means for setting said value of said reliability count of said network element  
5 to said maximum value if said network element is not in said  
6 dampening list.

1 47. The network device of claim 46, further comprising:  
2 means for setting said neighbor hold count for said network element; and  
3 means for sending a second unreliable packet to said network element.

1 48. The network device of claim 36, further comprising:  
2 initiating a neighbor pending timer.

1 49. The network device of claim 47, further comprising:  
2 means for removing said address of said network element from said neighbor  
3 pending list if said acknowledgement to said reliable packet is not  
4 received before said neighbor pending timer expires, and  
5 means for updating said value of said reliability count to reflect lower  
6 reliability of said network element if said acknowledgement to said  
7 reliable packet is not received before said neighbor pending timer  
8 expires.



50. The network device of claim 47, further comprising:  
 means for moving said address of said network element from said neighbor  
 pending list to said neighbor list if said acknowledgement to said  
 reliable packet is received before said neighbor pending timer expires,  
 and  
 means for removing said address of said network element from said  
 dampening list if said acknowledgement to said reliable packet is  
 received before said neighbor pending timer expires.

51. A computer program product for establishing bi-directional  
 connectivity of a network element in a network, encoded in computer readable media,  
 said program product comprising a set of instructions executable on a computer  
 system, said set of instructions configured to  
 receive a first unreliable packet from said network element;  
 store an address of said network element in a neighbor pending list;  
 send a reliable packet to said network element; and  
 if an acknowledgement to said reliable packet is received from said network  
 element,  
 accept said network element as a neighbor.

52. The computer program product of claim 51, wherein said unreliable  
 packet does not require a response.

53. The computer program product of claim 51, wherein said reliable  
 packet requires a response.

54. The computer program product of claim 51, wherein said accepting  
 said network element as neighbor is done by moving said address of said network  
 element from said neighbor pending list to a neighbor list.

1           55.     The computer program product of claim 4, wherein said set of  
2 instructions is further configured to:

3                 if said address of said network element is in said neighbor list,  
4                 update a neighbor hold count for said network element.

1           56.     The computer program product of claim 51, wherein said set of  
2 instructions is further configured to:

3                 determine if said address of said network element is in a dampening list.

1           57.     The computer program product of claim 56, wherein said set of  
2 instructions is further configured to:

3                 if said address of said network element is in said dampening list,  
4                 update a value of a reliability count of said network element to reflect  
5                 higher reliability of said network element.

1           58.     The computer program product of claim 57, wherein said set of  
2 instructions is further configured to:

3                 if said value of said reliability count is a maximum value,  
4                 move said address of said network element from said dampening list to  
5                 said neighbor pending list.

1           59.     The computer program product of claim 58, wherein said maximum  
2 value is predetermined.

1           60.     The computer program product of claim 58, wherein said maximum  
2 value is dynamically adjusted according to a traffic condition in said network.

1           61.     The computer program product of claim 56, wherein said set of  
2 instructions is further configured to:

3                 if said network element is not in said dampening list,  
4                 add said address of said network element to said dampening list, and  
5                 set said value of said reliability count of said network element to said  
6                 maximum value.

1           62.     The computer program product of claim 61, wherein said set of  
2 instructions is further configured to:  
3           set said neighbor hold count for said network element; and  
4           send a second unreliable packet to said network element.

1           63.     The computer program product of claim 51, wherein said set of  
2 instructions is further configured to:  
3           initiate a neighbor pending timer.

1           64.     The computer program product of claim 62, wherein said set of  
2 instructions is further configured to:  
3           if said acknowledgement to said reliable packet is not received before said  
4           neighbor pending timer expires,  
5           remove said address of said network element from said neighbor  
6           pending list, and  
7           update said value of said reliability count to reflect lower reliability of  
8           said network element.

1           65.     The computer program product of claim 62, wherein said set of  
2 instructions is further configured to:  
3           if said acknowledgement to said reliable packet is received before said  
4           neighbor pending timer expires,  
5           move said address of said network element from said neighbor pending  
6           list to said neighbor list, and  
7           remove said address of said network element from said dampening list.